

Patent Claims

1. A storage system (40) for storing a medium, in particular an adsorption storage system for adsorbing a medium, with a storage vessel (10), in which a storage material (30) is provided for storing, particularly for adsorbing a medium, and with a vessel connection (15) for loading/emptying the storage vessel (10), **hereby characterized** in that at least one circulation circuit (41) is provided for the storage medium, by means of which energy can be drawn off from the storage vessel (10) and/or can be input into it, that the storage medium serves as the energy carrier and that the storage vessel (10) is integrated in the circulation circuit (41), at least temporarily.
2. The storage system (40) according to claim 1, further characterized in that at least one heat exchanger (43) is provided in the circulation circuit (41), in order to bring the storage medium to a predetermined temperature.
3. The storage system (40) according to claim 2, further characterized in that at least one heat exchanger is provided in the circulation circuit (41) for cooling the storage medium.
4. The storage system (40) according to claim 2 or 3, further characterized in that at least one heat exchanger is provided in the circulation circuit (41) for heating the storage medium.
5. The storage system (40) according to one of claims 1 to 4, further characterized in that at least one transporting device (44) is provided in the circulation circuit (41).
6. The storage system (40) according to one of claims 1 to 5, further characterized in that the storage vessel (10) has at least one other vessel connection (18) for loading and/or emptying the storage medium.
7. The storage system (40) according to one of claims 1 to 6, further characterized in that the storage vessel (10) has an inner vessel (11) for the medium to be stored, an outer

insulating vessel (13) as well as a vessel connection (15) for loading/emptying the inner vessel (11), that the vessel connection (15) has an inner connection piece (16) connecting to the inner vessel (11) and an outer connection piece (17) connecting to the outer vessel (13) and that a coupling (20) is provided, which is configured in such a way that a separable coupling is produced or can be produced between the inner connection piece (16) and the outer connection piece (17).

8. The storage system (40) according to one of claims 1 to 7, further characterized in that the storage vessel (10) has an inner vessel (11) for the medium to be stored, as well as an outer insulating vessel (13), that at least one heat bridge (22) that can be engaged and disengaged is provided between the inner vessel (11) and the outer vessel (13), and that the at least one heat bridge (22) is configured in such a way that, for the purpose of heat exchange, a thermal connection is produced or can be produced, at least temporarily, between the inner vessel (11) and the outer vessel (13).

9. The storage system (40) according to one of claims 1 to 8, further characterized in that a storage material (30) for adsorbing a medium is provided in the storage vessel (10).

10. The storage system (40) according to claim 9, further characterized in that the storage material (30) is structured in the form of one or more pressed composites (31) of storage material.

11. The storage system (40) according to claim 9 or 10, further characterized in that a composite material for adsorbing a medium is provided as the storage material (30), that the composite material contains an adsorption material based on carbon and that the adsorption material contains admixtures at least of one additive material with high thermal conductivity.

12. The storage system (40) according to one of claims 9 to 11, further characterized in that a device (32) for conducting an electrical current through the storage material (30) is provided.

13. The storage system (40) according to one of claims 9 to 12, further characterized in that a device (33) for generating and introducing microwaves into the storage material (30) is provided.

14. A method for loading/emptying a storage medium into/from a storage system, which has a storage vessel, in which the temperature is reduced at least in the storage vessel for the loading of storage medium into the storage vessel, and in which the temperature is increased at least in the storage vessel for emptying the storage medium from the storage vessel, **hereby characterized** in that the temperature is adjusted within a circulation step, in which the storage medium is transported through the storage vessel by means of a circulation circuit, and that the storage medium serves as the energy carrier, by means of which energy is discharged from the storage vessel and/or input into it.

15. The method according to claim 14, further characterized in that the latter has steps for operating a storage system according to one of claims 1 to 13.

16. The method according to claim 14 or 15, further characterized in that it is used for loading/emptying an adsorption storage system.

17. The method according to one of claims 14 to 16, further characterized in that when the storage vessel is loaded, the storage medium will be cooled in the circulation circuit and then will be introduced into the storage vessel.

18. The method according to one of claims 14 to 17, further characterized in that when the storage vessel is emptied, the storage medium will be heated in the circulation circuit and then will be introduced into the storage vessel.

19. A use of a storage system according to one of claims 1 to 13 for storing hydrogen.

20. A use of a method according to one of claims 14 to 18 for loading/emptying hydrogen into/from a storage system.